

## Thyroid Profile in Liver Cirrhosis: Correlation with Disease Severity - A Cross-sectional Study

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### ABSTRACT

**Background:** Thyroid dysfunction is increasingly recognized in liver cirrhosis and may correlate with disease severity. **Methods:** Cross-sectional study of 89 cirrhosis patients. Thyroid function tests (FT3, FT4, TSH) were correlated with Child–Pugh (CP), MELD, and MELD-Na scores. **Results:** Thyroid abnormalities were present in 87.6%, with low FT3 syndrome most common. FT3 showed significant negative correlation with CP ( $p=0.001$ ), MELD ( $r=-0.369$ ), and MELD-Na ( $r=-0.59$ ). FT4 and TSH showed no significant correlation. **Conclusion:** FT3 is a reliable marker of disease severity in cirrhosis. Routine thyroid assessment is recommended.

**Keywords:** Liver cirrhosis, Thyroid function tests, MELD score, Child–Pugh classification, Hepatic dysfunction

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### INTRODUCTION

Liver cirrhosis represents the end stage of chronic liver disease and is associated with systemic metabolic disturbances. The liver plays a key role in thyroid hormone metabolism, particularly conversion of T4 to T3. Alterations in thyroid function, especially low FT3 syndrome, are frequently observed in cirrhosis and may reflect disease severity [1–4]. This study evaluates prevalence and correlation of thyroid dysfunction with severity of liver disease.

### MATERIALS AND METHODS

Hospital-based cross-sectional study including 89 cirrhosis patients diagnosed via ultrasound. Thyroid function tests were measured and correlated with CP, MELD, and MELD-Na scores using Spearman correlation. Statistical significance was set at  $p<0.05$ .

### RESULTS

**Table 1: Patient Characteristics and Disease Severity**

Parameter	Value
Mean Age	46.93 ± 10.94 years
Male:Female	4.23:1
Low FT3 prevalence	58.4%
Total thyroid dysfunction	87.6%

CP Class C 75.3%

**Table 2: Correlation with Child–Pugh Score**

Hormone	Test Statistic	p-value
FT3	14.399	0.001*
FT4	2.768	0.251
TSH	0.250	0.883

**Table 3: Correlation with MELD and MELD-Na**

Hormone	MELD (r)	MELD-Na (r)	Significance
FT3	-0.369	-0.59	<0.001*
FT4	-0.203	-0.165	NS
TSH	-0.201	-0.094	NS

\*p < 0.05 significant

## DISCUSSION

This study demonstrates a high prevalence of thyroid dysfunction in cirrhosis patients, with low FT3 syndrome being the predominant abnormality. These findings are consistent with prior studies showing altered peripheral conversion of T4 to T3 due to impaired hepatic deiodination [2,3]. The strong negative correlation between FT3 and disease severity (CP, MELD, MELD-Na) suggests that FT3 may serve as a reliable biochemical marker of hepatic dysfunction. This aligns with findings reported in multiple studies where declining FT3 levels reflect worsening hepatic reserve and metabolic derangement [4–7]. The absence of significant correlation for FT4 and TSH suggests that central thyroid regulation remains relatively preserved, while peripheral metabolism is primarily affected. This pattern is characteristic of non-thyroidal illness syndrome (sick euthyroid syndrome), commonly observed in chronic systemic diseases including cirrhosis. Pathophysiologically, reduced FT3 levels may result from decreased type 1 deiodinase activity, cytokine-mediated inhibition, malnutrition, and alcohol-related hepatic injury. Additionally, systemic inflammation and altered protein binding may contribute to observed hormonal changes. Clinically, these findings emphasize the importance of routine thyroid screening in cirrhosis patients. FT3, in particular, may provide prognostic information complementary to established scoring systems. Early identification of thyroid dysfunction may allow targeted interventions and improved risk stratification. Limitations include small sample size, single-center design, and reliance on ultrasound diagnosis. Future studies should evaluate

prognostic implications of thyroid dysfunction and potential therapeutic interventions.

By demonstrating a consistent inverse relationship between FT3 and disease severity, this study proposes FT3 as a potential adjunct prognostic biomarker that integrates metabolic dysfunction with hepatic reserve, thereby complementing conventional scoring systems such as Child–Pugh and MELD.

## CONCLUSION

Low FT3 syndrome is highly prevalent in liver cirrhosis and correlates strongly with disease severity. Routine thyroid function testing should be incorporated into clinical assessment of cirrhosis patients.

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